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## **THE GREAT LAKES ENFORCEMENT STRATEGY: USING ENFORCEMENT RESOURCES TO MAXIMIZE RISK REDUCTION AND ENVIRONMENTAL RESTORATION IN THE GREAT LAKES BASIN**

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### **SUMMARY**

This paper discusses the enforcement strategy of the U.S. Environmental Protection Agency (U.S. EPA) in the Great Lakes Basin, specifically focusing on our experience since 1990 in developing and implementing a geographically targeted enforcement strategy for reducing toxins in this area. The four key features of the strategy, namely risk-based targeting, multi-media enforcement, supplemental environmental projects, and environmental indicators, are discussed in detail. Several maps, charts, and graphs are used to illustrate these points.

### **1 INTRODUCTION**

Since waterways such as the Great Lakes have long served as a convenient, cheap means of transportation and source of energy, it is not surprising that our most concentrated industrial activity often centered on our most sensitive ecosystems. When intensive industrial activity occurs in sensitive ecosystems over long periods of time, the cost of reversing environmental damage and reducing the risk to human health can be enormous. For this reason and others, few countries can afford to use limited environmental enforcement resources in a purely reactive manner; instead, we must learn and teach means of maximizing the environmental benefit that can be derived from limited enforcement resources. This paper shares the experience of U.S. EPA in developing an enforcement strategy that tries to maximize environmental benefit in the Great Lakes Basin.

### **2 THE ENVIRONMENTAL PROBLEM**

More than 40 million people live in the Great Lakes Basin, including nearly 20 percent of the total U.S. population and 50 percent of the Canadian population (1). Over 23 million people depend on the Great Lakes for drinking water. For the last century, it has also been the industrial heartland of both countries. One quarter of all U.S. industry and more than 70 percent of U.S. and 60 percent of Canadian steel production occurs in the Great Lakes Basin, one of the largest fresh water systems in the world. The Great Lakes basin is a "sink ecosystem" such that contamination flows into it from a wide surrounding area, including Canada. Also, airborne contaminants such as DDT are suspected to be coming to the Great Lakes from as far away as Central America (2). Thus, the problem is not merely regional, but national and international in scope.

Over the past several years, U.S. EPA has begun developing and implementing a multi-media, geographically focused enforcement strategy for protection of the Great Lakes (Great Lakes Enforcement Strategy). The ultimate goal of this new approach is to restore the chemical, physical, and biological integrity of the Great Lakes Basin ecosystem. Due to the enormous scope of environmental problems in the Great Lakes Basin, U.S. EPA has emphasized the need to respond to

pollution in the context of the entire ecosystem and to focus on the reduction of risk to humans and the environment. More specifically, the Great Lakes Enforcement Strategy is expected to assist U.S. EPA in meeting the following goals: a 50% reduction in toxic loadings to the Great Lakes by 1996 and a significant measurable restoration of critical habitats and natural resources within the Great Lakes Basin.

### **3 INSTITUTIONAL FRAMEWORK**

The new enforcement strategy for the Great Lakes Basin was built upon the foundation of the Great Lakes Water Quality Agreement (GLWQA), which was signed by U.S. President Nixon and Canadian Prime Minister Trudeau on April 15, 1972 (3). The GLWQA, and its subsequent amendments, establishes a plan to restore and preserve the Great Lakes water quality.

According to the 1987 Protocol which amended the GLWQA, both the United States and Canada must consult with the State (Minnesota, Wisconsin, Illinois, Indiana, Ohio, Michigan, Pennsylvania, and New York) or Provincial (Ontario and Quebec) governments to designate "Areas of Concern" (AOC), areas which have been chemically or physically degraded by critical pollutants. (See Attachment 1 - The Great Lakes and Surrounding Area.) Currently, there are 43 AOCs: 26 wholly in the U.S., 12 wholly in Canada, and five jointly administered by the U.S. and Canada. One example of an AOC is the Indiana Harbor/Grand Calumet River, which has formed the centerpiece of U.S. EPA's Northwest Indiana/Southeast Chicago Geographic Enforcement Initiative (GEI). (See Attachment 2 - SE Chicago-NW Indiana GEI ZIP Areas.)

Responsibilities under the GLWQA have been delegated to U.S. EPA, which works with the relevant state environmental agencies in the U.S., while in Canada, Environment Canada works with the Ministry of Environment and Energy for Ontario and the Ministry of Environment for Quebec. Though it is primarily U.S. EPA which is using the Great Lakes Basin as a proving ground for the effectiveness of new enforcement strategies, some state environmental agencies and provincial ministries are following U.S. EPA's progress to determine whether some of these approaches may be worth adopting.

Within U.S. EPA, there are three regions that work together to implement GLWQA. Region V in Chicago covers six of the eight Great Lakes states: Illinois, Indiana, Michigan, Wisconsin, Ohio, and Minnesota. The remaining two states, Pennsylvania and New York, are covered by Regions III and II, respectively. Because U.S. EPA Region V and Canada share a 1,200 mile border along the Great Lakes, close ties exist between U.S. EPA with both Environment Canada and the Ministry of Environment and Energy for Ontario. For example, we do joint border inspections regarding hazardous waste import/export, and we also share leads on criminal activity. However, the strategies described in this paper have thus far been used only by U.S. EPA.

### **4 INNOVATIVE ENFORCEMENT STRATEGIES IN THE GREAT LAKES BASIN: FOUR DISTINGUISHING FEATURES**

Four key features distinguish the Great Lakes Enforcement Strategy from U.S. EPA's traditional mode of enforcement:

- Risk-based targeting of areas within the Great Lakes Basin for an intensified overall enforcement effort, and then targeting for inspection specific facilities within the selected geographic initiative based on health/environmental risk factors and history of compliance profiles.
- Comprehensive, integrated environmental inspection and follow-up enforcement under all environmental laws/programs and media, e.g., air, water, waste and so forth ("multi-media" inspection and enforcement).

- Penalty or fine mitigation in exchange for Supplemental Environmental Projects.
- Measuring the success of these enforcement strategies by developing and monitoring “environmental indicators,” i.e., indicators of quantifiable risk reduction or improvement in environmental conditions over specified periods of time.

#### 4.1 Risk-based targeting: geographic and facility-specific

##### 4.1.1 Geographic targeting

The first feature distinguishing the Great Lakes Enforcement Strategy is the targeting of selected geographic areas within the Great Lakes Basin for intensified enforcement efforts. As environmental laws and regulations have multiplied, it has become increasingly clear that the government will rarely, if ever, have the resources necessary to regularly inspect all facilities for compliance with all environmental laws and regulations. Even Region V of U.S. EPA, with the majority of its 1,000 employees and 100 lawyers devoted to enforcement on the U.S. side of the Great Lakes Basin, cannot inspect all the regulated facilities within the Basin and ensure compliance under all environmental laws. In the past, U.S. EPA’s inspection priorities focused mainly on “significant violators” (e.g., those facilities significantly deviating from important environmental standards) or “major sources” as determined by the size of the emission or discharge. Complaints by citizens or state and local governments would also influence priorities. These approaches were sometimes supplemented by initiatives to inspect those facilities subject to recently promulgated regulations (e.g., the boiler and industrial furnace regulation). However, these approaches to solving the problem of limited inspection and enforcement resources did not seem to net any measurable environmental improvement.

This has resulted in a shift of U.S. EPA’s inspection and enforcement resources towards high risk or heavy polluting facilities within the most heavily polluted districts in the Great Lakes Basin. This shift began in 1989 as Region V established the “Geographic Enforcement Initiative” (GEI) in Southeast Chicago and Northwest Indiana. U.S. EPA selected this area for a number of reasons discussed below.

By concentrating inspection and enforcement resources on such a clearly defined geographic area for a period of five to eight years, U.S. EPA expects to achieve measurable risk reduction and environmental restoration in three ways:

- First, by bringing more judicial/administrative enforcement actions against high polluting/noncomplying facilities in a designated area, Region V expects to increase compliance among those facilities directly targeted.
- Second, by communicating better to the public the goals of the geographic initiative and results of those enforcement actions within the selected geographic area, U.S. EPA could deter noncompliance by all industry/local governments operating within the high risk area.
- Third, the geographic initiative would encourage regulated facilities to implement pollution prevention projects and waste minimization projects as a means of either exempting themselves entirely from certain regulatory requirements or at least minimizing the risk of violating such requirements because of effluent or emission exceedences.

##### 4.1.2 GEI

Which geographic areas are being selected, and what kinds of criteria are being used to make these selections? An important factor in choosing areas for concentrated enforcement in the Great Lakes Basin is the expert judgment that has already been made under the GLWQA as to which areas present the greatest risk to health and the environment, i.e., the so-called “Areas of Concern”

(AOC's) designated by the U.S. and Great Lakes States under the GLWQA. The states must prepare Remedial Action Plans (RAPs) for each AOC within its boundaries; however, the cost of implementing the RAPs, which are designed to restore all beneficial uses within the AOC, is frequently in the millions of dollars (\$45 million to \$600 million) and beyond the means of federal and state coffers (4). Thus, enforcement actions and settlements which incorporate "environmental restoration projects" are particularly valuable in the AOC's. This was certainly one of the major factors driving the selection of Northwest Indiana/Southeast Chicago as the first GEI. Northwest Indiana contains one of the most heavily polluted AOC's, known as the Indiana Harbor/Grand Calumet River.

Other factors contributing to the selection of this and other areas for intensified enforcement are also those indicating a significant health or ecological risk. Toxic releases as recorded in U.S. EPA's Toxic Release Inventory (TRI), discussed below, are another key consideration (5). For example, Southeast Chicago and Northwest Indiana have much higher TRI emissions than most other areas within the Great Lakes Basin. Approximately 333 million pounds of TRI chemicals were released in this area in 1988. Similarly, a 1989 U.S. EPA study of air pollution showed significantly higher rates of cancer resulting from air exposure in Southeast Chicago (6).

In selecting geographic areas for intensified enforcement, U.S. EPA also gives weight to those environmental problems which directly impinge on the economic vitality of an area. For example, sediment contamination plagues the Indiana Harbor to such an extent that the U.S. government has not dredged Indiana Harbor for over 20 years (since 1972). Although dredging is supposed to occur every five years, the U.S. Army Corps fears dredging up toxic substances that can only be disposed of via expensive treatment in accordance with Land Ban standards under the Resource Conservation and Recovery Act. The resultant sediment accumulation is causing economic impacts as steel companies are forced to light-load barges. Sediment contamination does not only pose economic concerns but environmental problems as well. Because of "sediment loading" (sediments are so saturated that additional pollutants can no longer be absorbed by the sediments), more pollutants flow directly into Lake Michigan.

A final factor in selecting areas for enforcement concentration is a history of high noncompliance by industry and local governments, such as characterized Southeast Chicago and Northwest Indiana ever since the enactment of broad federal environmental laws in the early 1970's.

As Northwest Indiana/Southeast Chicago was the earliest area selected, the remainder of this paper will focus on progress in implementing the four innovative enforcement strategies within Northwest Indiana and Southeast Chicago. Other areas to be selected for future geographic enforcement initiatives are likely to be AOC's designated pursuant to the GLWQA and/or rivers and harbors with serious sediment contamination. Saginaw Bay and Manistique, Michigan, are under consideration for targeting. Another area containing no fewer than four AOC's is called the "Southeast Michigan Management Initiative." This initiative is still in the planning stages but will emphasize education/outreach and pollution prevention in addition to targeted enforcement.

#### 4.1.3 Facility targeting

Another component of "targeted enforcement" is "risk-based" targeting of individual facilities within a geographic initiative such as Northwest Indiana/Southeast Chicago for inspection and/or enforcement of all violations discovered. Such enforcement actions would then be resolved by full compliance and payment of a substantial penalty. Instead of inspection targets being determined by media-specific definitions of significant violations U.S. EPA Region V now uses a "cross-media" means of targeting those facilities that present the greatest overall risk to human health and the environment.

In 1989, this type of inspection planning was made possible by the establishment of a national Toxics Release Inventory data base (TRI), which began accumulating data in 1987. Section 313 of the Emergency Planning and Community Right to Know Act (EPCRA), sometimes referred to as Title III of the Superfund Amendments and Reauthorization Act, requires facilities to report annually on their releases of 575 toxics chemicals to the environment. This information is reported on a facility by facility basis. The releases are also reported in pounds per year by seven different media: water,

land, underground injection, fugitive air, stack air emissions, off-site to municipal wastewater treatment plants, and off-site to disposal facilities such as incinerators and landfills. (See Attachment 3 - Toxic Release Inventory for NW Indiana/SE Chicago GEI.) TRI is the first data base which can provide U.S. EPA with a consistent cross-media measure by which to compare facilities and geographic areas across the country based on overall risk presented.

Though a powerful tool in inspection targeting, TRI is not a perfect measure of risk. First, the chemicals reported to TRI have different levels of toxicity. Second, facilities with fewer than ten employees are not required to report in to TRI. While acknowledging these limitations, U.S. EPA Region V is using TRI data (or a subset thereof) to measure its success in achieving toxic reduction in the Great Lakes. As discussed below under "Environmental indicators," TRI is an important tool for targeting facilities for inspection, since it is also a key measure of whether the goal of 50% toxic reduction has been met by 1996 for Northwest Indiana and Southeast Chicago. This has been a critical lesson learned from the Northwest Indiana/Southeast Chicago initiative: to the extent possible, the overall enforcement targeting strategy should be closely tied to the measures of success for the enforcement initiative.

#### 4.2 Multi-media inspections/enforcement

Since a high rate of compliance was another goal of the Great Lakes Enforcement Strategy, we also targeted inspections towards those facilities with a history of noncompliance with environmental laws. This information was made available through two powerful U.S. EPA data bases, which are also critical to the second distinguishing feature of the Great Lakes Enforcement Strategy: "multi-media" inspection and enforcement. Beginning in 1990 in Northwest Indiana and Southeast Chicago, U.S. EPA, for the first time in its 20-year history, began to systematically identify and address violations on a multi-media or multi-statute basis. Formerly, U.S. EPA would inspect and enforce under one environmental statute or program at a time. For example, over a period of one to two years, the same facility would be visited by a U.S. EPA "air" inspector, then by a "water" inspector, and finally by a "hazardous waste" inspector. These inspections would then be followed by separate enforcement actions under each statute (the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act). This clearly was not the most effective use of scarce inspection and enforcement resources.

Now, as soon as U.S. EPA discovers a single violation at a facility, particularly at a facility ranked high on the TRI rankings, we review the facility's compliance record under all federal environmental statutes. This review is accomplished through three mechanisms:

- First, U.S. EPA can obtain a facility's compliance record under all federal environmental laws from the National Enforcement Investigation's Center (NEIC; located in Denver, Colorado) national multi-media compliance data base. NEIC's data base also contains a variety of financial data bases, such as Dun and Bradstreet.
- Second, we can now also tap a more recently developed information resource, the Integrated Data for Enforcement Analysis (IDEA) system, which compiles data bases from U.S. EPA and most state environmental agencies on a wide range of inspection and enforcement activities at regulated facilities throughout the U.S. Both the NEIC and IDEA data bases contain "enforcement sensitive" information exempt under the Freedom of Information Act.
- Finally, U.S. EPA may schedule the facility for a multi-media inspection under which a team of inspectors from all the major environmental programs (air, water, waste) conducts a comprehensive inspection for violations under all of those laws. Increasingly, even facilities with no known violations but with high TRI rankings are scheduled for multi-media inspections. U.S. EPA then brings a "consolidated

complaint" against the facility, citing all violations discovered under all federal environmental statutes.

As shown by the examples below, the multi-media approach to enforcement appears to have several advantages. First, it ensures that U.S. EPA does not miss violations at a facility. Second, it avoids the problem of the U.S. agreeing to compliance measures which transfer environmental problems from one media to another (e.g., solid waste to air). It also provides greater leverage for U.S. EPA to negotiate settlements that include privately funded environmental restoration projects. Finally, by ensuring that all environmental violations are corrected in the context of a single enforcement action rather than in piecemeal litigation, the multi-media approach appears to cost both U.S. EPA and industry less, conserving our enforcement resources.

Because of these clear advantages, multi-media enforcement is being implemented successfully by U.S. EPA, despite some institutional barriers. The major barrier is U. S. EPA's well-established "media-specific" organizational structure. Partly as a result of enforcement staff within the Regional office being unfamiliar with working across these well-established organizational boundaries, U.S. EPA Region V spent months longer than expected working to develop the first judicial case filed by U.S. EPA to cite violations under four major statutes: Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act (SDWA), the Clean Water Act (CWA), and the Clean Air Act (CAA). Working through a coordinating committee composed of regional enforcement representatives, headquarters enforcement staff, and representatives from the U.S. Department of Justice, the U.S. finally filed this precedent-setting complaint against Inland Steel in October 1990 (7). The Inland Steel complaint also was the first to seek a judicial order that Inland Steel must remediate contaminated sediments at the bottom of Indiana Harbor.

The Inland Steel case differs in one important respect from subsequent multi-media enforcement cases in the GEI insofar as the Inland case was developed through numerous single-media inspections. Violations from each inspection were then consolidated into a single complaint. As the multi-media enforcement strategy continues, U.S. EPA is developing more cases out of multi-media inspections. Just recently U.S. EPA filed its first case developed through multi-media inspections in Southeast Chicago. In July 1993, a multi-media complaint was filed against Sherwin Williams Company, which had been the subject of one of U.S. EPA's first multi-media inspections in September 1990 (8).

The development of this case exemplifies the learning experience which Region V encountered with its new, multi-media inspection process. The first inspection at Sherwin Williams brought forth few violations which could be remedied through enforcement action; therefore, the process was refined, and a second inspection was conducted at the facility in January 1992. This inspection led directly to the filing of the recent lawsuit, which alleges numerous violations of the CAA, CWA, RCRA, and EPCRA, and seeks the largest penalty under the statutory maximum sought to date by U.S. EPA. As U.S. EPA trains more multi-media inspectors and gains more experience doing multi-media inspections, it is expected that the time required to initiate an enforcement action after an initial inspection will decrease considerably from our experience in the Sherwin Williams case.

#### 4.3 Supplemental environmental projects in enforcement actions

A review of the settlements obtained for enforcement actions in Southeast Chicago and Northwest Indiana demonstrates another advantage that arises out of both geographic targeting of enforcement and "multi-media" enforcement: the enhanced ability of the U.S. government to obtain highly favorable settlements of such enforcement actions. In addition to substantial penalties, U.S. EPA has also been able to obtain environmentally beneficial projects (or "supplemental environmental projects"), often of a scale well beyond that which could be required unilaterally under existing environmental laws. Negotiating settlements of our enforcement actions that include supplemental environmental projects is the third innovative feature of our Great Lakes Enforcement Strategy. In Northwest Indiana, with its highly contaminated harbor sediments, U.S. EPA has agreed to accept

"sediment remediation" projects in exchange for limited penalty compromise in settlement of enforcement actions. (See Attachment 4, which depicts canal clean-up projects.) Such settlements, several of which are discussed below, are most common with facilities that may have long histories of contributing to the sediment contamination problem.

The Northwest Indiana settlements discussed below were also facilitated by the development of a U.S. EPA policy to encourage "Environmentally Beneficial Projects" in exchange for limited compromise of an assessed civil penalty (9). Such settlements depart from U.S. EPA's traditional mode of resolving an enforcement action. Prior to 1990, U.S. EPA generally would not consider any compromise of an assessed civil penalty, unless the alleged violator demonstrated an inability to pay the full penalty or the litigation risks of pursuing an enforcement case to trial warranted some compromise. As a general policy, U.S. EPA calculates penalties based on two components: economic benefit and the dollar amount reflecting gravity of potential or actual harm to the environment or integrity of the regulatory system. The Supplemental Policy does not allow any compromise of the "economic benefit" component of an assessed penalty, but it does contemplate limited compromise of the "gravity" component of an assessed penalty in exchange for five types of projects: Pollution Reduction, Pollution Prevention, Environmental Auditing, Public Awareness, and Environmental Restoration.

An early example of this type of settlement in the Northwest Indiana Enforcement Initiative was a settlement agreement between U.S. EPA and USX Corporation, resolving violations under the Clean Water Act at the USX Gary Steel Works facility (10). Under that settlement, USX paid a \$1.6 million civil penalty and was also required to upgrade its wastewater treatment plant at a cost of \$25 million, and to study the nature and extent of sediment contamination in a 12-mile stretch of the Grand Calumet River, at a cost of approximately \$2.5 million. USX will also spend an additional \$5 million on remediation of a five-mile stretch of contaminated sediments in the Grand Calumet River. This settlement marked a significant departure from the traditional settlement requiring only a return to compliance with the law violated and payment of a civil penalty.

Another settlement which has assisted U.S. EPA in its effort to achieve remediation of contaminated sediments in the Great Lakes was embodied in the October 1992 consent decree between U.S. EPA and LTV Steel, another major steel company in Northwest Indiana (11). The LTV settlement resolved claims under the Clean Water Act relating to oil spills and unpermitted discharges into an intake channel which flowed directly into Lake Michigan. In compliance with the timetable of the decree, LTV has already installed barriers to prevent contaminants from migrating into Lake Michigan, and has completed soil sampling of the area. Planning is also underway for a Sediment Removal and Disposal Project.

A more recent example is the consent decree which the U.S. EPA entered with Inland Steel Corporation, resolving claims under the CWA, CAA, RCRA, and SDWA in the 1990 lawsuit discussed above (12). Under the final settlement of that case, Inland Steel is required to attain compliance with all statutes (at an estimated cost of \$25 million) and pay a \$29.5 million civil penalty. The penalty includes supplemental environmental projects valued at \$26 million, with \$19 million being spent on sediment remediation in the Grand Calumet River. This settlement is unprecedented in the scope of the environmental restoration project being undertaken in response to claims of environmental regulatory violations.

It is doubtful that the U.S. EPA could have achieved equivalent environmental benefits from the Inland facility had it taken its traditional route of prosecuting violations under each environmental law separately and in a piecemeal manner. The fact that Inland Steel executives also knew they were in the heart of an ongoing geographic enforcement initiative and were the highest TRI releaser in the Great Lakes Basin provided further leverage for obtaining private monies for this large-scale sediment remediation project. (See Attachment 5 - Top 15 Priority Pollutant Releasers - 1990.)

U.S. EPA's ability to use its settlement authority in enforcement actions as a means of obtaining private monies towards the environmental restoration of "Areas of Concern" such as Northwest Indiana will enable the U.S. to implement more quickly and efficiently the Remedial Action Plans required for AOC's under the GLWQA. The environmental restoration and remediation projects described above

should also help U.S. EPA show progress on the “environmental indicators” selected for the Great Lakes.

#### 4.4 Environmental indicators and other measures of “success”

##### 4.4.1 Activity indicators

To bring U.S. EPA’s new enforcement strategy full circle, Region V has made an effort to evaluate the progress achieved in the Great Lakes, specifically in the Northwest Indiana/Southeast Chicago area (13). Historically, U.S. EPA has had great difficulty measuring “environmental improvement” resulting from its enforcement actions; instead, it has relied heavily on “activity indicators” as the primary measures of the success of its environmental enforcement programs. These activity indicators typically include the numbers of civil judicial and administrative enforcement cases filed and concluded each year, the number of criminal indictments and convictions obtained each year, and the dollar amount of penalties and fines. Other activity measures ranged from numbers of inspections per year to numbers of spill responses per year. Although activity measures do not directly reflect biological or ecological well being, they are nevertheless considered to be important elements for measuring the success of effective environmental enforcement programs. Not surprisingly, these activity indicators show steady increases in all categories of enforcement activity (inspections, warnings, formal commencement and conclusion of administrative and enforcement actions) in each year since that the enforcement initiative Northwest Indiana and Southeast Chicago commenced in 1989.

##### 4.4.2 Environmental indicators

Though activity indicators remain as an important measure of success in the Northwest Indiana/Southeast Chicago Initiative, U.S. EPA has for the first time evaluated its progress in restoring the environment in this area by monitoring selected “environmental indicators” for the five-year period from 1988 to 1992. U.S. EPA chose 1988 as the baseline year, since this was the first year in which TRI data, perhaps the most powerful environmental indicator, became available. The environmental indicators for this area can be divided into two categories: indirect and direct. (See Attachment 6 - Environmental Indicators—NW Indiana/SE Chicago GEI Area.) Indirect measures of environmental quality are generally “pollutant-load” related, i.e., they measure the quantity of pollutants entering the environment. Direct indicators used in the GEI are actual or estimated measures of human or ecological health. As one might expect, improvements in the direct environmental indicators frequently lag somewhat behind those shown in the indirect indicators.

###### 4.4.2.1 Indirect environmental indicators

The primary indirect environmental indicator being used by U.S. EPA to measure toxic reductions is the TRI data, which is a clear quantitative indicator of reductions in loadings of selected toxic substances to the environment. For example, several “pollutants of concern” (PC’s) have been identified by U.S. EPA as persistent problems for the Great Lakes and, in particular, for Northwest Indiana and Southeast Chicago. The TRI shows a 26% reduction in these PC’s since the 1988 base year. This decline may be in part attributed to the increase in enforcement activities in the area. The focused enforcement activity in the GEI has in turn fostered greater public awareness and has led to increased efforts by industry to reduce pollution. (See Attachment 7 - Decrease in Priority Pollutant Releases 1988-1990.)



#### 4.4.2.2 Direct environmental indicators

Direct environmental improvement or degradation in the Grand Calumet River in Northwest Indiana is currently measured by the Index of Biotic Integrity (IBI). This "direct environmental indicator" is based on numbers and diversity of the fish community. It was developed several years ago by Dr. J.R. Karr. State environmental agencies, universities, and U.S. EPA have begun to use it as a means of evaluating the environmental health of bodies of water. Over the initial five-year period of study, U.S. EPA has not been able to detect significant improvement in the water quality of the Calumet River and the Indiana Harbor. (See Attachment 8 - Index of Biotic Integrity - 1985 through 1990.) These results are consistent with a number of historical observations and reflect the very stressed conditions in this section of the Great Lakes. These findings suggest that enforcement initiatives such as the GEI must be pursued long-term in order to make a measurable improvement in the water quality of heavily contaminated areas such as the Indiana Harbor. With the eventual completion of the major environmental restoration projects described in the Inland Steel, USX, and LTV settlements referred to earlier, U.S. EPA would expect some improvement in the direct environmental indicators over the next five-year period.

## 5 CONCLUSION: LESSONS LEARNED

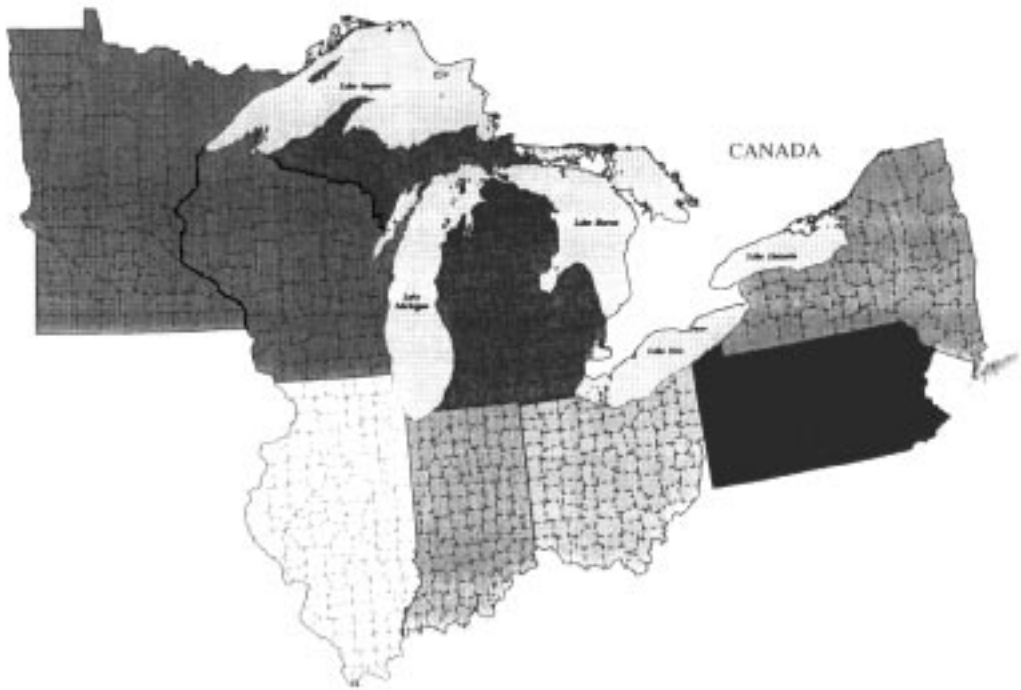
Based on the preliminary success of the GEI, U.S. EPA plans to continue this enforcement strategy and expand it to other areas within the Great Lakes Basin. Although much more is yet to be learned from initiatives such as the GEI, several conclusions can be drawn from U.S. EPA's experience to date. First, with limited enforcement resources, integrated environmental data bases such as the TRI and IDEA are essential for risk-based targeting. These tools are also important for facilitating multi-media enforcement and for targeting facilities based on their history of compliance. Additionally, these data bases can help measure the success of enforcement programs by providing both activity indicators and environmental indicators that reflect changes in rates of compliance and in the overall risk to health and the environment. At the same time, to better evaluate U.S. EPA's progress towards achieving our goal of significant toxics reduction and environmental restoration in the GEI and in the Great Lakes Basin overall, we must continue to refine the measures of our enforcement success. In particular, U.S. EPA must work to develop direct environmental indicators in addition to the Index of Biotic Integrity.

Based on the indicators developed thus far, U.S. EPA has learned that our new "result-oriented" enforcement strategy has initially shown immediate gains in the activity indicators and in the indirect environmental indicators such as TRI. However, it has become clear that in areas such as the Great Lakes, which have suffered historically from decades of environmental degradation, short-term improvements in direct environmental indicators cannot be expected. U.S. EPA's experience has proven that to achieve significant improvements in the direct environmental indicators, a commitment longer than our three-year effort in Northwest Indiana/Southeast Chicago will be necessary.

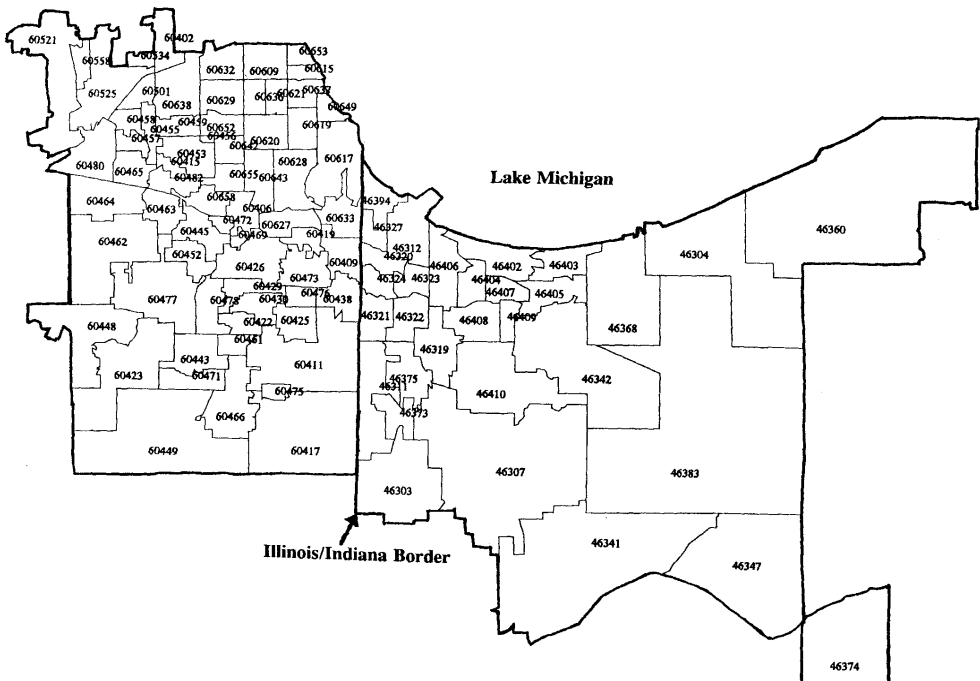
Finally, U.S. EPA's experience has shown that measurable environmental gains may often indirectly result from an intensified enforcement effort, insofar as industry's and the public's awareness of this effort leads to a greater commitment to pursue pollution prevention and waste minimization projects. In order to take advantage of this dynamic, U.S. EPA has begun to supplement its actions within the Geographic Enforcement Initiative with intensified efforts to educate industry and the public about options for waste minimization and pollution prevention. In sum, the results of our new enforcement strategy to date suggest that both directly and indirectly, the enforcement of environmental laws can indeed be an engine of progress in the improvement of our environment.

## REFERENCES

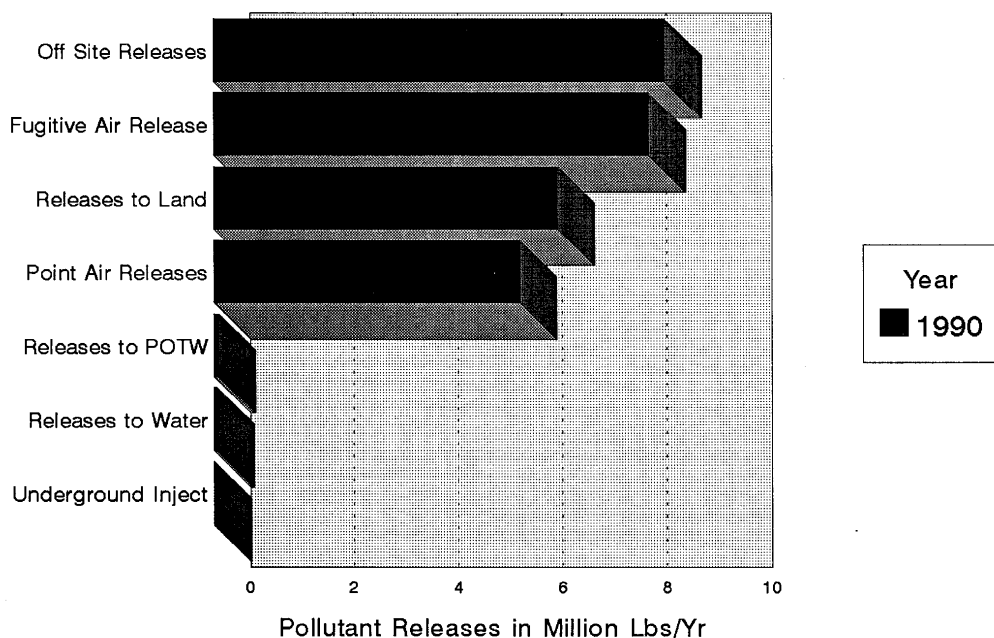
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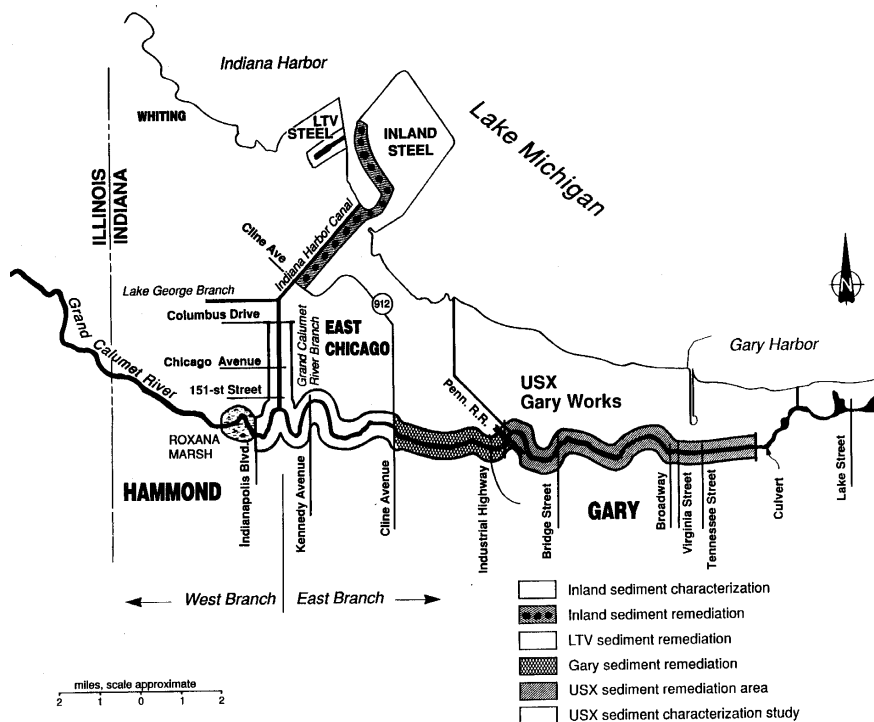
**Attachment 1.** The Great Lakes states and surrounding area.



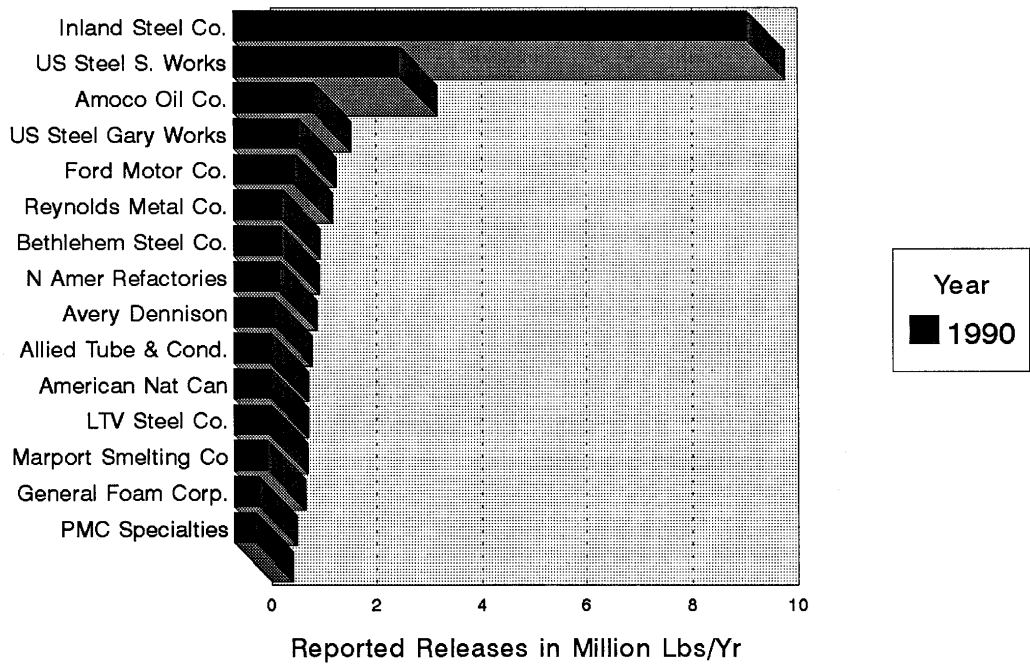
**Attachment 2.** SE Chicago - NW Indiana GEI ZIP areas.



**Attachment 3.** Toxic release inventory for NW Indiana/SE Chicago GEI, reported priority pollutant releases 1990.



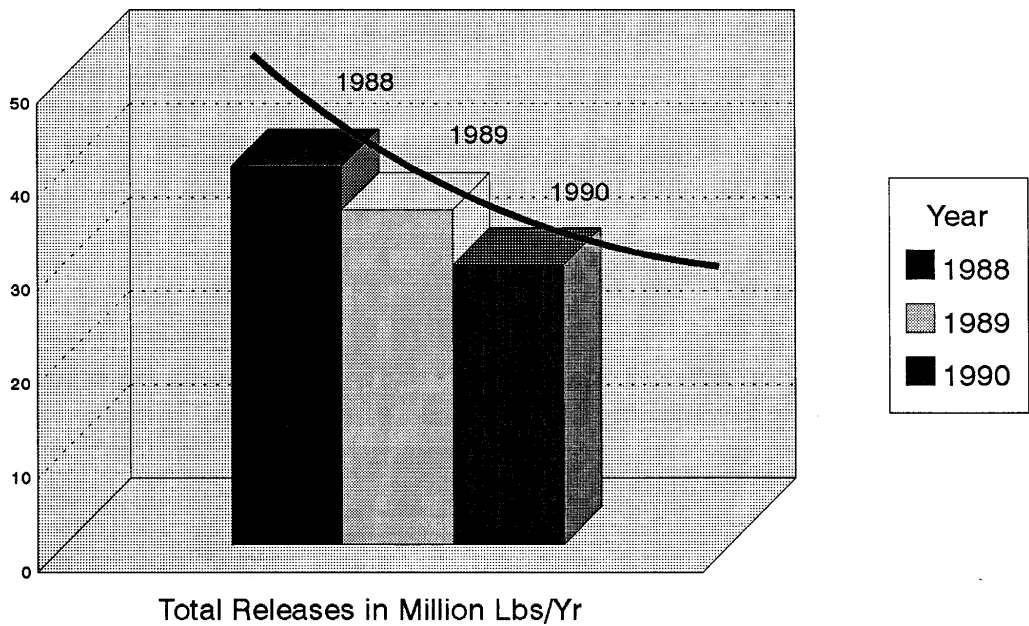
**Attachment 4.** Grand Calumet River/Indiana Harbor Canal area.



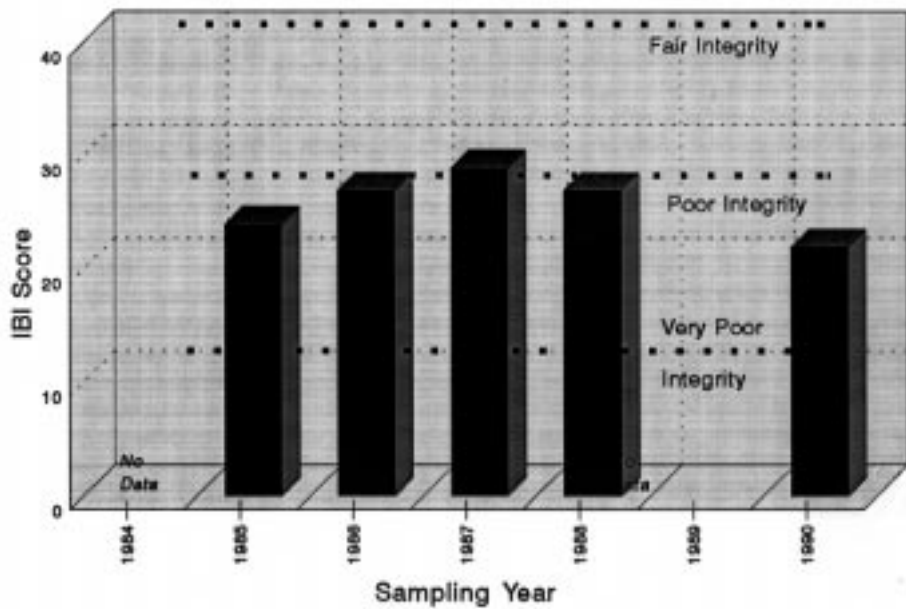
**Attachment 5.** Toxic release inventory for NW Indiana/SE Cook Co. GEI, top 15 priority pollutant releasers—1990.

<b>Program</b>	<b>Indicator Category</b>	<b>Description of Indicator</b>	<b>Data Source</b>
All	Indirect (Load)	Number of Facilities Reporting POC Releases/yr	TRI
All	Indirect (Load)	Total POC Releases All Media in pounds/yr all sources	TRI
All	Activity Indicator	Numbers of Inspections total/yr multi & single media	GEI TF Programs
All	Activity Indicator	Numbers of Referrals total/yr multi & single media	GEI TF Programs
All	Activity Indicator	Numbers of Settlements total/yr multi & single media	GEI TF ORC
All	Indirect (Load)	Pollutant Reductions which result from Enforcement Settlements in pounds/yr	GEI TF ORC
All	Activity Indicator	Cost (in dollars) of injunctive relief and SEPs from Enforcement Agreements or conclusions	GEI TF ORC Programs
Air	Indirect (Load)	POC Releases to Air Media in pounds/yr all sources	TRI
Water	Indirect (Load)	POC Releases to Water Media in pounds/yr all sources	TRI
Water	Direct (Eco)	Index of Biotic Integrity as IBI score by sampling loc.	R5 Reports
Waste RCRA	Indirect (Load)	POC Releases to Land Media in pounds/yr all sources	TRI
Waste SF	Activity Indicator	Reduction in Immediate Threats in # spill responses/yr	WASTLN
Waste SF	Activity Indicator	Removal & Remedial Actions in # sites progressing/yr	WASTLN
Waste SF	Indirect (Load)	Materials Addressed by Tech Based Controls in cu yds/yr	WASTLN
Water TSCA	Indirect (Load)	Volume of Contaminated Sediment Removed in cu yds/yr	IPPTF PTSB

Attachment 6. Environmental indicators NW Indiana/SE Chicago GEI area.



**Attachment 7.** Toxic release inventory for NW Indiana/SE Chicago GEI, decrease in priority pollutant releases 1988-1990.



Note: Values are also representative of Indiana Harbor & Ship Canal

**Attachment 8.** Index of biotic integrity (IBI)—1985 through 1990, health of East Branch Grand Calumet River based on fish community sampling.

**MAP AND GRAPH REFERENCES**

Attachments 1-3 and 5-8 were originally published in the following source: U.S. EPA Region V GEI Task Force. "Northwest Indiana-Southeast Cook County GEI Environmental Progress 1988-92: A Report of Selected Environmental Indicators," July 15, 1993.

Attachment 4 was provided by Robert D. Tolpa, Acting Chief, Compliance and Special Activities Unit, U.S. EPA Region V.